AMENDMENTS TO THE CLAIMS

1-86. (Cancelled).

87. (Withdrawn) A pharmaceutical composition comprising a substance binding to a human tumor specific oligosaccharide sequence containing a terminal protein linked GlcNAcβ-structure or a terminal protein linked GlcNAcβ-glycan-structure for the treatment of a human cancer.

88. (Withdrawn) The pharmaceutical composition according to claim 87, wherein said human cancer is a human tumor and said human tumor specific oligosaccharide sequence is expressed on the cell surface or tissue surface of said human tumor.

89. (Withdrawn) The pharmaceutical composition according to claim 87, wherein said substance is a human antibody, humanized antibody, or glycosyltransferase enzyme.

90. (Withdrawn) The pharmaceutical composition according to claim 88, wherein said human tumor is diagnosed to express elevatedly said human tumor specific oligosaccharide sequence when compared to patient's normal tissue.

91. (Withdrawn) The pharmaceutical composition according to claim 87, wherein said oligosaccharide sequence has the sequence according to Formula

$[GlcNAc\beta x/Gal\beta 3]_{s1}(GlcNAc\beta 1\text{-}6)_{s2}Sacch$

wherein x is 3, when Sacch is GalNAc; or

x is 2 , when Sacch is Man; and wherein

s1 and s2 are independently 0 or 1 with the proviso that there is at least one terminal GlcNAc; the structure is branched, when both s1 and s2 are 1; Sacch is GalNAc with the provision that it is not α6-linked to another GalNAc; Sacch is GlcNAcβ with the proviso that s1 and s2 is 0 and said GlcNAcβ is linked to a protein or peptide; [GlcNAcβx/Galβ3] means that terminal residue is either GlcNAcβx or Galβ3.

92. (Withdrawn) The pharmaceutical composition according to claim 87, wherein said substance binding to said oligosaccharide sequence is specific to one or several of the terminal oligosaccharide sequences of a N-glycan type structure according to Formula

$$[GN\beta 2Man]_{r1}\alpha 3([GN\beta 2Man]_{r2}\alpha 6)\{Man[\beta 4GN[\beta 4(Fuc\alpha 6)_{r3}GN]_{r4}]_{r5}\}_{r6} \quad (I)$$

wherein r1, r2, r3, r4, r5, and r6 are either 0 or 1 with the proviso that at least r1 is 1 or r2 is 1; GN is GlcNAc, with the proviso that when both r1 and r2 are 1, one GNβMan can be further elongated with one or several other monosaccharide residues, and one GNβ2Man can be truncated to Man, and Manα6 residue and/or Manα3 residue(s) can be further substituted by GNβ6 or GNβ4, and Manβ4 can be further substituted by GNβ4.

93. (Withdrawn) The pharmaceutical composition according to claim 92, wherein said substance binding to said oligosaccharide sequence is specific to one or several of the terminal oligosaccharide sequences of a N-glycan type structure according to Formula

$$[GN\beta2Man]_{r1}\alpha3([GN\beta2Man]_{r2}\alpha6)\{Man[\beta4GN]_{r5}\}_{r6} \qquad (II)$$

wherein r1, r2, r5, and r6 are either 0 or 1, with the proviso that at least r1 is 1 or r2 is 1; GN is GlcNAc, with the proviso that when both r1 and r2 are 1, one GNβMan can be further elongated with one or several other monosaccharide residues, and one GNβ2Man can be truncated to Man, and Manα6 residue and/or Manα3 residue can be further substituted by GNβ6 or GNβ4, and Manβ4 can be further substituted by GNβ4.

94. (Withdrawn) The pharmaceutical composition according to claim 92, wherein said oligosaccharide sequence is

GlcNAcβ2Man, GlcNAcβ2Manα3(GlcNAcβ2Manα6)Man,

GlcNAcβ2Manα3(GlcNAcβ2Manα6)Manβ4GlcNAc,

GlcNAcβ2Manα3(GlcNAcβ2Manα6)Manβ4GlcNAcβ4GlcNAc,

GlcNAcβ2Manα3(GlcNAcβ2Manα6)Manβ4GlcNAcβ4(Fucα6)GlcNAc,

GlcNAcβ2Manα3(Manα6)Man, GlcNAcβ2Manα3(Manα6)Manβ4GlcNAc,

GlcNAcβ2Manα3(Manα6)Manβ4GlcNAcβ4GlcNAc,

GlcNAcβ2Manα3(Manα6)Manβ4GlcNAcβ4(Fucα6)GlcNAc,

Man α 3(GlcNAcβ2Manα6)Man, Manα3(GlcNAcβ2Manα6)Manβ4GlcNAc,

Man α 3(GlcNAcβ2Manα6)Manβ4GlcNAcβ4GlcNAc,

Man α 3(GlcNAcβ2Manα6)Manβ4GlcNAcβ4(Fucα6)GlcNAc, GlcNAcβ2Manα3Man,

GlcNAcβ2Manα3Manβ4GlcNAc, GlcNAcβ2Manα3Manβ4GlcNAcβ4GlcNAc, GlcNAcβ2Man

α 3Manβ4GlcNAcβ4(Fucα6)GlcNAc, GlcNAcβ2Manα6Man,

GlcNAcβ2Manα6Manβ4GlcNAc, GlcNAcβ2Manα6Manβ4GlcNAcβ4GlcNAc, or

GlcNAcβ2Manα6Manβ4GlcNAcβ4(Fucα6)GlcNAc

95. (Withdrawn) The pharmaceutical composition according to claim 91, wherein said substance binding to said oligosaccharide sequence is specific to one or several of the terminal oligosaccharide sequences of an O-glycan type structure according to Formula

$[GlcNAc\beta3]_{s1}[Gal\beta3]_{s2}(GlcNAc\beta6)_{s5}GalNAc$

wherein s1, s2 and s5 are independently 0 or 1, so that the oligosaccharide sequence comprises at least one nonreducing end terminal GlcNAcβ-residue.

96. (Withdrawn) The pharmaceutical composition according to claim 95, wherein said oligosaccharide sequence is protein linked GlcNAc or a derivative thereof.

97. (Withdrawn) The pharmaceutical composition according to claim 95, wherein said oligosaccharide sequence is

GlcNAcβ3Galβ3(Galβ4GlcNAcβ6)GalNAc, GlcNAcβ3Galβ3(GlcNAcβ6)GalNAc, GlcNAcβ3Galβ3GalNAc, Galβ3(GlcNAcβ6)GalNAc, GlcNAcβ3(GlcNAcβ6)GalNAc, GlcNAcβ6GalNAc, or GlcNAcβ3GalNAc

98. (Withdrawn) The pharmaceutical composition according to claim 87 further comprising a substance binding to one or several of the following terminal oligosaccharide sequences:

GlcNAcβ3Gal, GlcNAcβ3Galβ4GlcNAc, GlcNAcβ6Gal, GlcNAcβ6Galβ4GlcNAc GlcNAcβ3(GlcNAcβ6)Gal, and GlcNAcβ3(GlcNAcβ6)Galβ4GlcNAc

said composition being for the treatment of lung, larynx, colon, gastric or ovarian cancer.

99. (Withdrawn) The pharmaceutical composition according to claim 87, wherein said oligosaccharide sequence is linked by an unnatural glycosidic linkage to other monosaccharide or oligosaccharide structures.

100. (Withdrawn) The pharmaceutical composition according to claim 87, wherein said substance binding to said oligosaccharide sequence is an aptamer, a peptide or a protein.

101. (Withdrawn) The pharmaceutical composition according to claim 100, wherein said protein is an antibody, a lectin, or a fragment thereof.

102. (Withdrawn) The pharmaceutical composition according to claim 100, wherein said protein is an enzyme recognizing the terminal GlcNAc-structures.

103. (Withdrawn) The pharmaceutical composition according to claim 87 comprising a polyvalent conjugate of said oligosaccharide sequence wherein position C1 of the reducing end terminal of the oligosaccharide sequence (OS) comprising the tumor specific terminal sequence of the invention is linked (–L–) to an oligovalent or a polyvalent carrier (Z), via a spacer group (Y), forming the following structure

$$[OS - (X)_n - L - Y]_m - Z$$

where integer m have values $m > 1$ and n is independently 0 or 1; L can be oxygen, nitrogen, sulfur or a carbon atom; X can be lactosyl-, galactosyl-, poly-N-acetyl-lactosaminyl, or part of an O-glycan or an N-glycan oligosaccharide sequence, Y is a spacer group, a terminal conjugate or a linkage to Z.

104. (Withdrawn) The pharmaceutical composition according to claim 87 comprising a pharmaceutically acceptable carrier and/or an adjuvant.

105. (Withdrawn) Use of a substance binding to a human tumor specific oligosaccharide sequence containing a terminal protein linked GlcNAcβ-structure or a terminal protein linked GlcNAcβ-glycan-structure for the manufacture of a medicament for the treatment of human cancer.

106. (Withdrawn) A method for diagnosing cancer or tumor in a biological sample taken from a human patient, the method comprising determining the presence in said sample of an oligosaccharide sequence which comprises a tumor specific terminal protein linked GlcNAcβ-structure or a terminal protein linked GlcNAcβ-glycan-structure.

107. (Withdrawn) The method according to claim 106 wherein the determination comprises

(a) contacting said biological sample with a substance binding to said oligosaccharide sequence, and

determining the presence of a combination of said substance and said sample, the presence of said combination being an indication of cancer present in said sample, or

(b) releasing the oligosaccharide structures of said biological sample by enzymatic or chemical methods to form a fraction containing free oligosaccharide structures from said sample, and

determining the presence of said oligosaccharide sequence in said fraction, the presence of said oligosaccharide sequence in said fraction being an indication of cancer present in said sample.

108. (Withdrawn) The method according to claim 106, wherein said oligosaccharide sequence is a terminal oligosaccharide sequence as defined in claim 91.

109. (Withdrawn) The method according to claim 106, wherein said cancer is a tumor.

110. (Withdrawn) The method according to claim 106, wherein a cancer or tumor type is determined.

111. (Withdrawn) The method according to claim 106, wherein normal glycosylation of the tissue containing the cancer is determined.

112. (Withdrawn) The method according to claim 106, wherein the glycosylations are determined on the surface of cancer or normal tissue

113. (Withdrawn) Diagnostic agent comprising a substance binding to a human tumor specific oligosaccharide sequence containing a terminal protein linked GlcNAcβ-structure or a terminal protein linked GlcNAcβ-glycan-structure for the diagnosis of human cancer or cancer type.

114. (Withdrawn) Antigenic substance comprising a terminal protein linked GlcNAcβ-structure or a terminal protein linked GlcNAcβ-glycan-structure in a chemically or biochemically synthezised polyvalent form.

115. (Withdrawn) Use of the antigenic substance according to claim 114 or analogs or derivatives thereof to produce polyclonal or monoclonal antibodies.

116. (Withdrawn) Use of the antigenic substance according to claim 114 or analogs or derivatives thereof for the purification of antibodies from human serum.

117. (Withdrawn) Use of the antigenic substance according to claim 114 or analogs or derivatives thereof for the detection and/or quantitation of antibodies.

118. (Withdrawn) A cancer vaccine comprising oligosaccharide sequences containing a terminal protein linked GlcNAcβ-structure or a terminal protein linked GlcNAcβ-glycan-structure or analogs or derivatives thereof.

119. (Withdrawn) The cancer vaccine according to claim 118 comprising a pharmaceutically acceptable carrier and/or an adjuvant.

120. (Withdrawn) A substance binding to a terminal protein linked GlcNAcβ-structure or a terminal protein linked GlcNAcβ-glycan-structure for the treatment of a human cancer, wherein said substance is an aptamer, human natural or humanized antibody or peptide.

121. (Withdrawn) A method for identifying cancer or tumor specific therapeutics or diagnostic agents comprising the steps of contacting a compound with a terminal protein linked GlcNAcβ-structure or a terminal protein linked GlcNAcβ-glycan-structure and determining binding to said oligosaccharide sequence by said compound.

122. (Withdrawn) A human anti-GlcNAc antibody obtainable by:

passing human serum sample through a column containing immobilized terminal GlcNAcβ epitopes;

washing the column;

eluting the column with a buffer containing high concentration of GlcNAc;

and collecting the antibody.

123. (Withdrawn) A functional food or food additive containing antibodies recognizing a terminal protein linked GlcNAcβ-structure or a terminal protein linked GlcNAcβ-glycan-structure for the treatment of human cancer or tumor.

124. (Withdrawn) A functional food according to claim 123, wherein said antibody is produced in milk or in hen eggs.

125. (Withdrawn) The antibody according to claim 122, wherein said antibody recognizes oligosaccharide sequence GlcNAcβ6GalNAcα-O-CH_2-R,

GlcNAcβ6(Galβ3)GalNAcα-O-CH_2-R, GlcNAcβ2Man or GlcNAcβ-O-CH_2-R or GlcNAcβ3GalNAcα-O-CH_2

126. (Withdrawn) Method of treatment or diagnosis of cancer or tumor comprising transferring a modified monosaccharide derivative to cancer cells or tumor by a glycosyl transferase or a transglycosylate enzyme.

127. (Withdrawn) The method according to claim 126 wherein said modified monosaccharide derivative is a terminal protein linked GlcNAcβ-structure or a terminal protein linked GlcNAcβ-glycan-structure.

128. (Withdrawn) The method according to claim 126 wherein said modified monosaccharide derivative is according to the formula

UDP-GalN[-S]-D,

wherein

S is an optional spacer group

D is derivatizing group including molecular labels such as for example biotin or a fluorecent molecule including, or a toxic agent, prodrug or prodrug releasing substance.

129. (Withdrawn-Previously Presented) The method according to claim 126 wherein the modified monosaccharide is UDP-GalN-spacer-biotin or UDP- N-(6-biotinamidohexanoyl)galactosamine.

130. (Withdrawn) The method according to claim 126 wherein the modified monosaccharide is transferred by a galactosyltransferase which is engineered to transfer effectively 2-modified monosaccharides or a natural GalNAc/GlcNAc-transferase with similar specificity with the said modified galactosyltrasferase from animals.

131. (Withdrawn) The method according to claim 126 wherein said modified monosaccharide derivative is transferred to cell or tissue.

132. (Previously Presented) A composition comprising an enzyme substrate, capable of being transferred specifically to a surface of a pathogenic entity or malignant cell or tissue by a transferring enzyme making a covalent linkage between said enzyme substrate and an acceptor structure of said surface for use as a medicine, wherein

the enzyme substrate is a 2-modified monosaccharide residue and the transferring enzyme is a glycosyltransferase or a transglycosylating enzyme; or the enzyme substrate is a modified monosaccharide residue and the transferring enzyme is a transglycosylating enzyme.

133. (Previously Presented) The composition according to claim 132, wherein said enzyme substrate is conjugated to an immunologically active substance and/or a toxic substance.

134. (Previously Presented) The composition according to claim 132, wherein said enzyme substrate is a carbohydrate substance capable of being transferred specifically to the surface of a pathogenic entity or malignant cell or tissue by the transferring enzyme.

135. (Previously Presented) The composition according to claim 132, wherein said transferring enzyme is a transsialidase or a transglycosylate enzyme.

136. (Previously Presented) The composition according to claim 132, wherein said enzyme substrate is a 2-modified monosaccharide residue.

137. (Previously Presented) The composition according to claim 132, wherein said enzyme substrate is according to the Formula UDP-GalN[-S-]-D, wherein S is an optional spacer group, D is a derivatizing group including molecular labels selected from the group consisting of biotin, a fluorescent molecule, a toxic agent, a prodrug ~~or~~ and a prodrug releasing substance.

138. (Currently Amended) The composition according to claim 132, wherein said enzyme substrate is transferred by a galactosyltransferase which is engineered to transfer effectively 2-modified monosaccharides or by a natural GalNAc/GlcNAc-transferase with similar specificity with said ~~modified~~ engineered galactosyltransferase from animals.

139. (Previously Presented) The composition according to claim 132, wherein the enzyme substrate is a 2-modified monosaccharide residue and the transferring enzyme is a glycosyltransferase enzyme.

140. (New) The composition according to claim 132, wherein the enzyme substrate is position 2-modified monosaccharide and the modification on position 2 includes a chemoselective linking group.

141. (New) The composition according to claim 140, wherein the chemoselective linking group is selected from the group consisting of: linking group effective in water solutions or aqueous buffers, protein and tissue compatible linking group, which does not react, or does not essentially react with amino acid residues or other structures present on the material to be targeted, a thiol group, an aldehyde group, a ketone group and an amino-oxy group.

142. (New) A cell or tissue covalently modified by the composition according to claim 132.

143. (New) A composition comprising an enzyme substrate and a transferring enzyme, wherein said enzyme substrate can be transferred specifically to a surface of a pathogenic entity or malignant cell or tissue by said transferring enzyme making a covalent linkage between said enzyme substrate and an acceptor structure of said surface and wherein the enzyme substrate is a

2- modified monosaccharide residue and the transferring enzyme is a glycosyltransferase or a transglycosylating enzyme.

144. (New) A cell or tissue covalently modified by the composition according to claim 143.

145. (New) The composition according to claim 143, wherein said enzyme substrate is transferred by a galactosyltransferase which is engineered to transfer effectively 2-modified monosaccharide or by natural GalNAc/GlcNAc-transferase with similar specificity with said engineered galactosyltransferase from animals.

146. (New) The composition according to the 143, wherein the enzyme transfers to an acceptor structure selected from the group consisting of: an oligosaccharide present on a pathogenic entity, O-glycan, N-glycan, polylactosamine, carbohydrate, glycoconjugate, lipid, and terminal β-GlcNAc structures.

147. (New) The composition according to the claim 146, wherein said enzyme substrate is transferred by a galactosyltransferase which is engineered to transfer effectively 2-modified monosaccharide or by natural GalNAc/GlcNAc-transferase with similar specificity with said engineered galctosyltransferase from animals.